

Bifax lacinia, **N** **G** **S**
T **(Batrachoididae)** **S**
C **O**

David W. Greenfield, Jonathan K.L. Mee and John E. Randall

Abstract: A new genus and species of toadfish in the subfamily **B** is described from the Arabian Sea. The genus is unique because of its highly modified frontal bones resulting from the very depressed head, and the possession of a flap with an eye spot at the end of the maxilla on each side of the mouth. The specimens of this toadfish were collected from crevices in rocky walls between depths of 6-8 m on the south coast of Oman.

(Batrachoididae العائل) **■** *Bifax lacinia*
 بي لسلطنة عمان

Batrachoidinae رنوع
 الضفدعي هذه من في الحوت اعماق: **■** وقد تم على
 و ٨ كبير الجنوبي

INTRODUCTION

While engaged in field collections in southern Oman for the Oman Marine Science and Fisheries Center during 1989, the second author noted several individuals of what later proved to be a unique toadfish. The anterior portions of three individuals were noted in horizontal crevices at the base of very large limestone boulders in a small bay near Raysut. Initial collection attempts were unsuccessful and caused the fish to retreat out of view into the narrow crevices. In 1990 the second and third author were able to revisit the general area and collected the first of seven specimens using quinaldine sulfate. We determined that this species with its unique jaw flaps is undescribed and does not belong to any recognized genus.

Abbreviations:

- BMNH The Natural History Museum, London
- BPBM Bernice P. Bishop Museum, Honolulu
- CAS California Academy of Sciences, San Francisco
- USNM U.S. National Museum of Natural History, Washington, D.C.

MATERIALS AND METHODS

All counts and measurements follow HUBBS & LAGLER (1964). Measurements were made using dial calipers to the nearest 0.1 mm. All measurements are expressed as thousandths of standard length (SL). Counts were made with the aid of radiographs. Osteological characters were described based on a cleared and stained individual (BPBM 35843, 267.5 mm SL). The colour description is based on 35 mm colour photographs taken above and under water by the third author.

Genus *Bifax* n. gen.

Type species: *Bifax lacinia*.

Diagnosis: A member of the subfamily Batrachoidinae, because it lacks the two venomous, hollow dorsal-fin spines and opercular spines characteristic of the Thalassophryneinae; lacks the two opercular spines and two solid dorsal-fin spines of the Porichthyinae. It shares the following characters with other members of the Batrachoidinae: three solid dorsal-fin spines, three solid opercular spines. It does not have bone exposed on the dorsocranium under the skin that is not covered by epaxial trunk muscles as in the genera *Amphichthys*, *Sanopus*, and "*Triathalassothia*" *gloverensis*, but rather the dorsocranium is completely covered by muscle. It is separated from the other known genera in the Batrachoidinae by the following characters: very wide, flat frontal bones that are not separated anteriorly to receive the ascending processes of the premaxillary bones as in other genera, but rather the frontal bones form a shelf that slopes down and fuses with the vomer; and the presence of a flap with an eye spot at the end of the maxilla on each side of the mouth.

The upper pectoral-fin radial is totally ossified in *Bifax*, whereas it is all or part cartilage in the following batrachoidin genera: *Austrobatrachus*, "*Batrachthys*" *apiatus*, *Halobatrachus*, *Perulobatrachus*, and *Riekertia*. There are two spines on the subopercle in *Bifax*, whereas the following genera only have a single spine: *Austrobatrachus*, *Batrachoeomoeus*, *Halobatrachus*, *Opsanus*, and *Triathalassothia*. An undescribed freshwater genus from the Rio Araguaia, Brazil has three spines on the subopercle. The frontal bones in *Bifax* are solid, lacking a foramen on each side, but the foramina are present in *Batrachoeomoeus* and *Halophryne*, and two species of uncertain generic status (*reticulatus*, *grunniens*). *Bifax* lacks scales on the body, whereas species in the following genera have the body completely scaled: *Barchatus*, *Batrachoides*, *Chatrabus* (= *Tharbacus*), and *Halobatrachus*; or partially scaled: *Riekenia*. *Batrachthys* lacks a pit at the top and glandular tissue on the inside of the pectoral-fin axil (present in *Bifax*). The remaining genus (undescribed but represented by "*Austrobatrachus*" *dussumieri*), besides having the standard narrow frontal bones as in other genera of the Batrachoidinae, also differs from *Bifax* in having teeth present on the ventral edge of the premaxilla for at least 80 % of the length from the anterior portion of the bone to the distal end (in *Bifax* teeth are present only on less than the first half of the ventral surface of the bone, with the teeth then curving around to the back side of the premaxilla for the remainder of its length). "*Austrobatrachus*" *dussumieri* also has the pelvic-fin bases close together (about equal to one eye diameter apart), whereas in *Bifax* they are farther apart (about two eye diameters).

Description: Three solid dorsal-fin spines, no venom glands. Three opercular and two subopercular spines. Dorsocranium completely covered by muscle, no exposed bone under skin. Body lacking scales. Head greatly depressed, with very wide, flat frontal bones that form a shelf

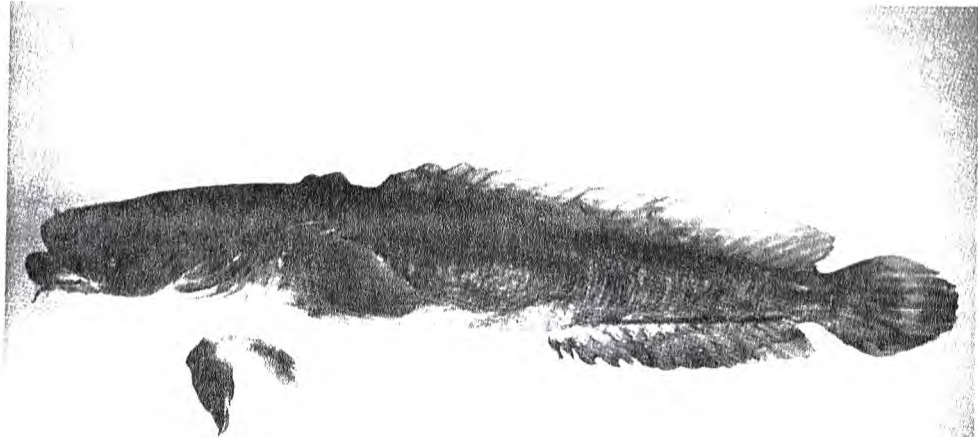


Plate 1: *Bifax lacinia*,
holotype, BPBM
35949, 215.7 mm SL
(photo J. E. Randall).

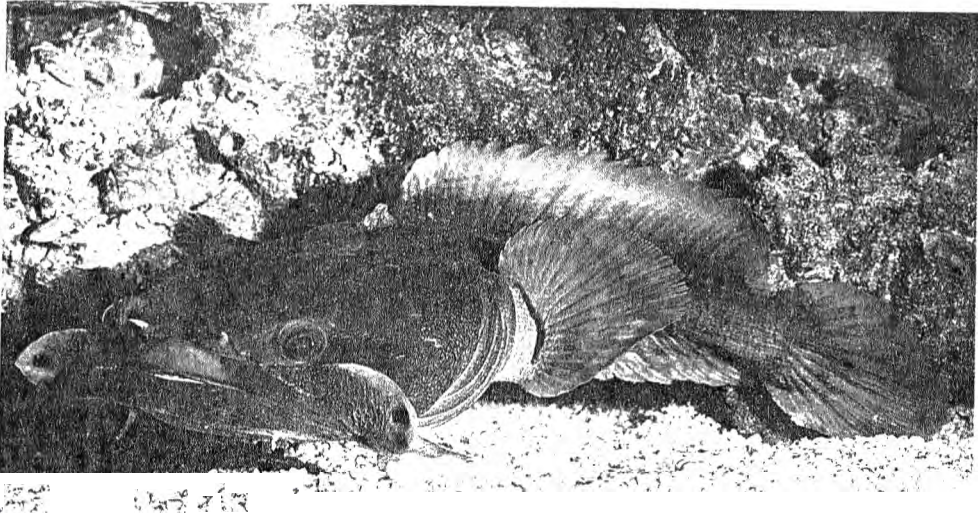


Plate 2: *Bifax lacinia*,
BPBM 35843,
267.5 mm SL, aquari-
um photograph of
paratype (photo J. E.
Randall).

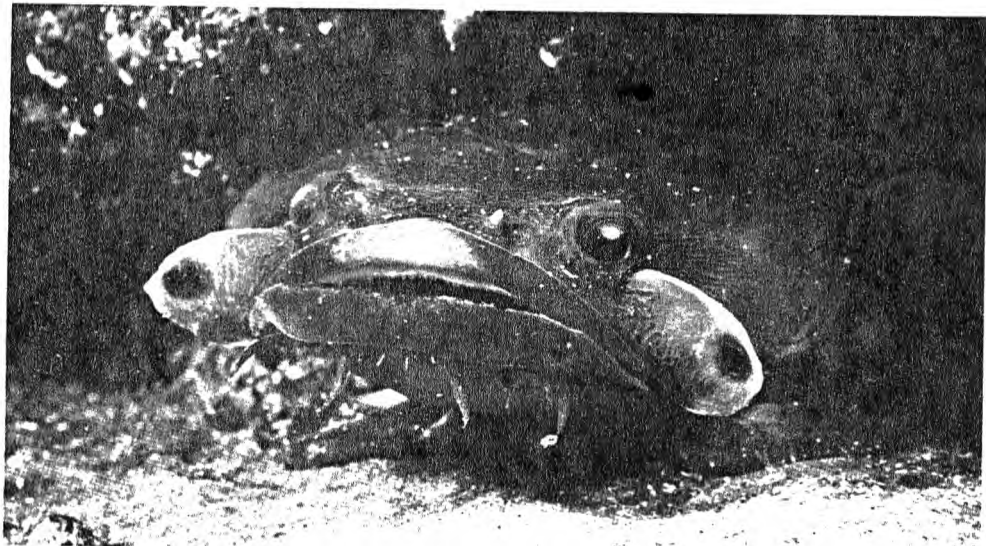


Plate 3: *Bifax lacinia*,
BMNH 1994.4.5.1,
264 mm SL, under-
water photograph of
paratype (photo J. E.
Randall).

multitaeniatus, and two starfish (*Fromia* sp.). The tank was aerated and filtered, but within ten minutes of placing the toadfish in the tank, the other two fishes were observed to be in distress with loss of equilibrium. The water surface also had a slightly foamy look. The toadfish was behaving normally. The other two fishes were removed to clean water in another aquarium; however, they were dead in another ten minutes. The starfish still were moving around in the tank, but were removed as a precaution. The next morning they were dead. The third author tasted mucus from the skin of the toadfish and found it very unpleasant, suggesting the presence of a toxin. Extensive glandular tissue is present in the area covered by the pectoral fin and this may be the source of the toxin. This toxin might be a defense against predators and in particular large *Gymnothorax* eels that are found in similar crevices.

The very depressed head and the resulting wide, flat frontal bones appear to be an adaptation to living in narrow crevices. The pelvic-fin bases are far apart and also probably are a result of the depressed body and head.

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